"As we enter the next decade, we want to change the traditional way of thinking about pest management by reducing reliance on the most risky pesticides and promoting safer alternatives."

—Dr. Paul Helliker, Director, Department of Pesticide Regulation

California has regulated pesticides for more than 100 years. Its citizens—through their Legislature—have established a comprehensive body of law to control every aspect of pesticide sales and use and to assure that the state's pesticide regulators also have the tools to assess the impacts of that use.

The first pesticide-related law was passed in this state in 1901, and since the 1960s, a whole body of modern, increasingly science-based pesticide law and regulation has come into being.

The California Department of Pesticide Regulation (DPR) protects human health and the environment by regulating pesticide sales and use and by fostering reduced-risk pest management. DPR's strict oversight begins with product evaluation and registration, and continues through statewide licensing of commercial applicators, dealers and consultants, residue testing of fresh produce, and local permitting and use enforcement by agricultural commissioners in each of the State's 58 counties.

Early Pesticide Regulation: Focus on Consumer Fraud

Before World War II, pesticide regulation was a low priority at both the state and federal levels. Few pesticides were used in agriculture, primarily insecticides and fungicides. There was little concern about their long-term effects on health or the environment.

The focus of pesticide regulation in the early 20th century was on protecting pesticide users from fraud by ensuring product quality. Pesticides, like many products of the time (including foods and drugs), were often adulterated or mislabeled. It was not unusual for manufacturers to make extravagant claims for products that were useless at best, and sometimes destructive to the plants on which they were used.

California's first pesticide law, passed in 1901, charged the Director of the Agricultural Experimental Station with ensuring the quality of a single product, an arsenic-based chemical known as "Paris Green."

In 1910, Congress passed the Federal Insecticide Act, essentially a labeling law concerned with protecting consumers from ineffective products or deceptive labeling. It contained neither a federal registration requirement nor any significant safety standards.

California's parallel legislation, the State Insecticide and Fungicide Act of 1911, was also primarily concerned with mislabeling and adulteration, but went beyond federal law in that it required pesticides be registered (with the University of California) before they could be sold.

In 1921, the Economic Poison Act, transferred responsibility for pesticide registration to the California Department of Agriculture (CDA), created two years before from the State Commission on Horticulture. ("Economic poison" was a synonym used for "pesticide." Legislation in the 1990s substituted statutory references to "economic poison" with the more commonly understood "pesticide.") The 1921 law expanded CDA's authority beyond insecticides and fungicides.

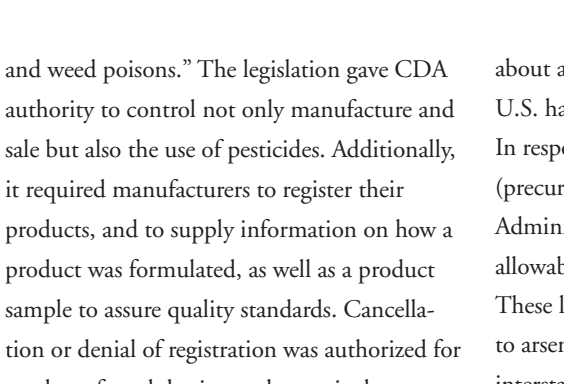
A 1921 Department report described the law as "a novelty in legislation of this type, there being no other law, state or national, regulating the manufacture and sale of rodent poisons

and weed poisons." The legislation gave CDA authority to control not only manufacture and sale but also the use of pesticides. Additionally, it required manufacturers to register their products, and to supply information on how a product was formulated, as well as a product sample to assure quality standards. Cancellation or denial of registration was authorized for products found detrimental to agriculture or public health.

To put teeth into this provision, the act was amended in 1929 to give CDA authority to require "practical demonstration as may be necessary" to determine that products were effective and that they were not "generally detrimental or seriously injurious to vegetation." This first limited ability to call in data was necessary to provide legal grounds to deny or cancel registration.

The 1920's: Residues on Food Become a Concern

In 1926, the state's pesticide regulators began analyzing small quantities of fresh produce for residues. A public outcry in Great Britain about arsenic-treated fruit coming in from the U.S. had led to the threat of a British embargo. In response, the U.S. Bureau of Chemistry (precursor to the U.S. Food and Drug Administration) set the first federal limits on allowable pesticide residues on harvested fruit. These limits—called tolerances—applied only to arsenic residues on apples and pears in interstate commerce and for export. In 1927, the California Legislature passed the Spray Residue Act to control residues of arsenic-based sprays on fruits and vegetables. California's new residue testing program was designed as much to promote marketing of the state's fruit as to safeguard consumers against harmful arsenic residues. (Only about 30 pesticide active ingredients were in use at the time, many of them toxic arsenic- and copper-based compounds.) The goal was to ensure that no shipments of California fruit were confiscated at their destination because of excess residues. Through the 1930s, the residue-monitoring program was expanded to include sampling for lead, fluorine, and copper. With the introduction of many new synthetic organic pesticides in the late 1940s, residue sampling expanded again to test for DDT and other organic compounds.



The Post-War Years and the "Green Revolution"

After World War II, many new synthetic organic pesticides found their way into agriculture, including agents that controlled nematodes and weeds, that defoliated plants and preserved wood, and that stimulated or retarded plant growth. These chemicals, along with new, high-yield plant varieties, chemical fertilizers, irrigation technology, and mechanization, helped prompt the so-called "Green Revolution." For several years following the war, pesticides were viewed as miracle chemicals. They substituted for higher-priced, labor-intensive weed and insect control methods and pest reducing practices. This chemical trend immediately reduced labor needs, provided more effective control, and increased yields.

In the late 1940s there was a dramatic increase in pesticide use. Growers experimented with the new products, applying them in a variety of ways on a variety of crops, sometimes with insufficient knowledge of their effects or toxicity. Benefits were immediately apparent—healthy plants and increased yields. However, there were problems as well. Drift caused damage to non-target crops and killed livestock and honeybees. Improper applications caused injury and death to workers and others.

New Chemicals Prompt New Controls

Legislation in 1949 led to the State's first regulations governing pesticide handling and imposing restrictions on certain pesticides with the potential to cause injury to people, crops, or the environment. Permits were required to possess or use these pesticides.

California's regulations continued to be fine-tuned throughout the 1950s as an increasing number of newly developed but highly toxic chemicals were introduced to the market. Detailed regulations were adopted including buffer zones to protect adjacent crops and residences, and restrictions on nozzle sizes, wind velocities, and other factors to limit drift.

Silent Spring: New Concerns About Long-Term Effects

The 1960s forever changed the way society viewed pesticides. Although problems had been apparent for some time—most notably, concerns about possible acute health effects and the increasing resistance of some pests to

the new products—the signal event was the publication in 1962 of *Silent Spring*. Author Rachel Carson presented compelling arguments that pesticides and other chemicals were being used with little regard for their impact on either human health or the environment. *Silent Spring* is widely considered to have sparked the modern environmental movement.

Many changes in federal and state law have come about since *Silent Spring*. In 1969, Congress passed the National Environmental Policy Act (NEPA), which required federal agencies to consider environmental matters before undertaking new actions.

In 1969 and 1970, landmark legislation in California required a "thorough evaluation" of pesticides before registration and gave the CDA clear authority to establish criteria for studies to be submitted by pesticide manufacturers. This legislation also gave the Department authority to restrict how pesticides may be used. The Director was also required to begin a program of continuous evaluation of pesticides and eliminate from use those posing a danger to the agricultural or nonagricultural environment.

Two years later, the Department hired its first "in-house" evaluation scientists to review data submitted to support registration requests

In 1972, CDFA began licensing agricultural pest control advisers, later requiring training and continuing education. Adviser licensing was directed at setting standards for professional conduct for those who advise growers on pest control methods by requiring that

pest control recommendations be in writing, making advisers legally accountable. In 1999, new regulations were adopted requiring that after 2002, prospective advisers must take more college courses related to integrated pest management and sustainable agriculture.

The 1970s saw an expansion of CDFA's pesticide enforcement focus. Federal grant money allowed the Department to upgrade its field offices with additional staff. This made possible more training and better supervision of the county agricultural commissioners, who have primary responsibility for field enforcement of the state's pesticide regulations. Field inspection procedures were standardized, their scope widened to include all aspects of pesticide use (with a particular emphasis on worker safety), record-keeping, storage, and disposal.

California's Environmental Quality Act and Its Impact on Pesticide Regulation

In 1970, California passed its own version of NEPA: the California Environmental Quality Act (CEQA), the state's principal law requiring environmental impact review of development projects in California and applies generally to all state and local agencies and to private activities that the agencies finance or regulate.

In 1976, the State Attorney General issued an opinion that the state's pesticide regulatory program had to comply with CEQA when registering a pesticide or granting a license, permit or certificate. In the same vein, county agricultural commissioners were required to prepare an EIR before approving several thousand permits issued annually to users of certain, high-hazard ("restricted") pesticides.

After a specially convened Environmental Assessment Team determined this was not feasible, legislation was passed in 1978 allowing for an abbreviated environmental review procedure, based on the Department's pre-registration evaluation of pesticides and requirements for site-specific permits for use of the more hazardous materials.

The 1980's: A Decade of Legislative Mandates

In 1983, Governor Deukmejian designated the pesticide regulatory program within CDFA as the lead in pesticide matters.

DPR's Director during most of the nineties James W. Wells remembers,

> *"I believe that Cal/EPA's most significant accomplishment in the early days was to foster better communication among departments and boards that had*

different environmental responsibilities. We all got to know each other better and our regular discussions on how air, water, toxics, waste and pesticide problems related to each other helped us find better solutions to those problems.

"The cleanup of the metam sodium spill in the Sacramento River, which faced the new Agency on the day of its birth, is a case in point. Although the spill was an ecological nightmare, the innovative response coordinated by Cal/EPA prevented an even greater disaster in Lake Shasta."

Increasing concern about air pollution resulted in the passage of the 1983 Toxic Air Contaminant Act giving the State broader authority over airborne toxins. While most of the control measures reside with the Air Resources Board, industry concerns about practical pesticide regulation led to special provisions for pesticides.

In 1984, the Legislature passed the Birth Defect Prevention Act requiring that all registered pesticides have complete and adequate chronic health effects studies. This increased the scope and responsibilities of CDFA's registration functions and led to the creation in 1985 of a separate Medical Toxicology Branch to evaluate toxicological data and prepare health evaluations and risk assessments, the only such program in the nation.

The Pesticide Contamination Prevention Act of 1984 focused on reducing the effects of pesticides in groundwater. The law required the Department to establish a database of wells sampled for pesticides, to collect data on the physical properties of pesticides that might lead to groundwater contamination, and to control the use of and monitor for these pesticides.

In the 1980s, the U.S. EPA began developing a national worker protection standard, initially modeling it on California's pioneering work in this area. Most elements of California's worker safety program exceeded the federal standard and, where it did not, regulatory changes were made to bring those portions into compliance.

During the 1980s, the decades-old residue-monitoring program was expanded and enhanced. The most significant addition was the Priority Pesticide Program, designed to provide data useful for accurate assessments of dietary risk. With it, the Department began targeted sampling of commodities known to have been treated with pesticides of health concern.

Pesticide Regulation Given Departmental Status

In 1991, California's environmental authority was unified in a single Cabinet-level agency—the California Environmental Protection Agency (Cal/EPA). As part of this reorganization, the pesticide regulation program was removed from CDFA and given departmental status as the Department of Pesticide Regulation within Cal/EPA.

Because DPR is responsible for regulating pesticide use in water, air, soil and biological organisms, the department has long had a cross-media program, working with staff of California's water, air and wildlife protection agencies through agreements to ensure a coordinated and effective approach to pesticide regulation regardless of the media involved.

The most notable accomplishments of the 1990s included fulfilling legislative mandates by completing collection of required health effects data on a priority list of 200 pesticides of highest health concern, and at the same time completing collection of environmental fate data on potential groundwater-polluting pesticides.

As part of its commitment to encouraging voluntary, community-based, pollution prevention programs, DPR is one of the few government agencies in the nation awarding grants to help develop innovative pest management practices that reduce the risks associated with pesticide use. A grants program established in 1996 was expanded in 1998 with a complementary program of public-private alliances targeted at reducing pesticide risks to workers, consumers, and the environment. The grants program embodies DPR's approach of funding small, localized projects that help groups take research results and move them into the field via applied research and demonstration projects that if successful, can be funded for broad geographic implementation.

Accomplishments and Future Directions

DPR's primary mission is ensuring the safe use of pesticides. Since its creation in 1991, the Department has made significant strides in enhancing worker and environmental protections, strengthening uniformity of enforcement in the field, streamlining the regulatory process to encourage registration of safer materials, encouraging the development and use of reduced-risk pest management practices, and using existing and new statutory requirements to ensure the completion of an up-to-date toxicological data base for all pesticide active ingredients.